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(54) METHOD OF TREATMENT OF TOOTH HARD TISSUES BY LASER  
RADIATION AND DEVICE FOR ITS REALIZATION

(57) Abstract:

FIELD: medical equipment, applicable in stomatology at treatment of caries and dental prosthetics. SUBSTANCE: the method consists in action of laser pulse on the tooth tissue, acoustic pulse arising at interaction of radiation with the tissue is detected, and the type of the tissue to be treated is determined according to the pulse peak amplitude. The device uses a pulsed laser and means for delivery of radiation from the laser to the tooth arranged in succession from the laser to the tooth arranged in succession in the optimal axis; the input of the means of radiation delivery is optically integrated with the laser output, has an acoustic pickup and an electric pulse peak amplitude meter, whose input is electrically coupled to the acoustic pickup output, and the output is electrically coupled to the display unit input; the acoustic pickup is installed in such a manner that the direction of its maximum sensitivity makes up angle  $\alpha$  with the direction of the optical axis at the output of the radiation delivery means, this angle satisfies condition:  $11^\circ < \alpha < 66^\circ$ . EFFECT: reduced danger of laser injury to patient. 6 cl, 5 dwgr

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(51) Int. Cl: A6105/00 A61N5/06

(56) References cited:

1. Harem<sup>s</sup> CILIA N 4521194. Kn. A 61 C 5/00. 1986. 2. ABTopcKoe CBHACTCnbCTBO CCCP N 1593669, Kn. A 61 C 5/00, 1990. 3. WO, naTeHT, 89/08432, Kn. A 61 C 5/00, 1989. 4. WO, naTeHT, 90/01907, Kn. A 61 C 5/00, 1989.

(71) Applicant: YLie6Ho-HayYHo-npoH3BOJ;cTBeHHbILI "J1a3epmbILI ueHTp" I4HCTHTyTa To<sup>1</sup>HOI McXaHHKH H OHTHKH

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(73) Proprietor: Yue6HO-Hay<sup>L</sup>n o-IIpoH3BOJ;cTBeHHbI2 "Ha3epHbiti ueHTp" MHCTHTyTa To<sup>1</sup>HO2 McXaHHKH H OHTHKH

(54) CIIOCOB OBPABOTKI4 TBEPIbIX TKAHEYI 3YBA JIA3EPHbIM 143JTY<sup>L</sup>IEHI4EM 14 YCTPOLICTBO JIJII5I EpO OCYIi(ECTBJIEHYI5I

(57) Abstract:

I43o6peTenne OTHOCHTCH K Me,HHH4HCKOLI TCXHHKe H MO?KCT 6bITb BCHOHb3O6aHO B CTOMaTOMOPHH npa negeHHH Kapaeca B HpOTe3HpOBaHHH 3y6OB. OCHOBHbIM HeJ;OCTaTKOM 143BCCTHbIX CIIOCO6OB 06pa6OTKH TBepJ;bIX TKAHeH 3y6a na3epHbIM B3nyHeHHem B ycTpouCTB, peanH3yion4Hx 3TH CnoC06I, HBHCTCH BbICOKaSI OhaCHOCTb HaHeCeHHH na3epnoi TpaBMbi nau eHTy. Llenblo H306peTeHHSi HBHeTCH CHHIKeHHe OhaCHOCTH HaHeceHHSi nauieHTy na3epuofl TpaHMBI 3a c<sup>L</sup>TeT o6ecneueHHH B03MO?KHOCTH onpegenem THHa o6pa6amiBaemoi TKAHH. YKa3anHasi Ijenb J;ocTHrae'rcsi -rem, <sup>L</sup>ITO B cnocoe 06pa6oTKH TBCp6bIX TKaHeI/I 3y6a na3epHbIM H3nyeHHem, HKnIO<sup>L</sup>taionjeM B031telaeTBHe Ha TKAHH 3y6a na3epHOpo HMnynbCa, perHCTpupyloT aKyCTH<sup>L</sup>TeCKH11 HMIIynbc, B03HiiKaIO114HLI HpH B3aHMOJ;eiICTBH H3ny<sup>L</sup>TeHHSi c TKaHeIO, no HHKOBOII aMIIeHTy/de KOTOpOpO onpegenHIOI THH o6pa6amiBaemoi TKAHH. YKa3aHHasi ikenb TaK?Ke J(ocTHraeTcH 'rem, <sup>L</sup>ITO ycTpouCTBO J;enH o6pa6oTKH TBepJ;bIX TKAHei 3y6a na3epHbIM v13nyenvleM, COCT05II ee 113 noCneJIOBaTenbHO paCnonoKeHHbIX B) Onb OnTH<sup>L</sup>TeCKOii OCH HMpynbCHOpo na3epa H cpeJ cT6a gOCTaBKH LI3ny<sup>L</sup>TeHHSi OT na3epa K 3y6y, BXOJ; KOTOpOpO 01ITH<sup>L</sup>TeCKH conpSui eii c BbIXO) OM na3epa, COgep?KHT aKyCTH<sup>L</sup>TeCKHII npHeMHHK H B3MepHTenb HHKOBOH aMIIIIITYgbl 311eKTPII4eCKHX HMHynCOB, BXOJ; KOTOpOpO 3neKTPH<sup>L</sup>TeCKH COH?KeH c BbIXOgOM aKyCTH<sup>L</sup>TeCKOpo npHeMHHKa, a BbIXOJ; 3neKTPH<sup>L</sup>TeCKH COH?KeH co BXOJ(OM yCTpOiiCTBa I/liJ;HKaII HII/I, npH<sup>L</sup>TeM aKyCTH<sup>L</sup>TeCKHII npHeMHHK yc'paHOBneH TaKBM o6pa3OM, <sup>L</sup>ITO HanpaBneHHe ero MaKCYIMaHbHO2 <sup>L</sup>IyBCTBHTenbHOCTLI COCTaBHeT c HanpaBneHHem OTHHIIecKOI2 ocm Ha BbIXOgC Cpe);CTBa AOCTaBKH H3ny<sup>L</sup>CH45I OT na3epa K 3y6y yrOn a , yJIOBneTBOpHoIi i4I ycnOBHo: >.i° < d < 86 . 2 c. H 4 3.114-nbl, 5 rm.

**Description [Onncautie H3o6peTeHJst]:**

I/13o6peTeaue OTHOCHTCH K McJ(HIWHCKOii TeXHHKe H MO?KeT 6bITb HCIIOJIB30BanO B cToMaTonopH npH ne<sup>t</sup>leHHH KapHeCa H npOTC3HpOBaHHLI 3y6oB.

<sup>1</sup>/<sub>13</sub>BeCTeH cnoco6 yjaneHHH xauanbHblx KapHO311b1X UOBpe2KJjeHHil H/HJIIH KaMHeil 3y6a (naTeHT USA 4521194, A 61 C 5/00, npHOпHTeT **22.12.83 r.**), BKnlolalalonglil o6pa6oTKy TBepJ;b1X TKaHCii 3y6a HMnynbCHbIM na3epHbIM 113nyeHHCM. OCHOBHbIM HeX(OCTaTKOM J;aHHOpO cnoco6a **HBIHeTCH** BbICOKaH OnacnocTb HaneCeHHH na3epaoil TpaBMbl npH o6pa6oTKe TBepJ1b1X TKaHeil 3y6a.

Han6onee *6II* 3KHM no TeXHH<sup>t</sup>leCKOII c y IOCTH H npMHHTbIM 3a npOTOTHn **HbHCTCH** cnoco6 neueHHH HeOCnO)KHeHHOpO xapneca (a. c. **CCCP** N 1593669. A 61 C 5/00, npHOпHTeT 14.11.85 r. ony6n. 23.09.90 r. B14 N 35), BKnlouaIOII10 o6pa6oTKy TBCp>ibIX TKaHeil 3y6a **na3epHbIM B37IyueHHCM** c JjfhHOLI BOJIIbI **2,94 MKM**. JpiwTeni,HOCTb1O HMnyJ1bCOB **100-500 MKC**, MOIHOCThIO 0,5-1,0 J12K/HMn, IUIOTHOCThIO MOU **POCTH**  $2 \cdot 10^4 + 3 \cdot 10$  BT/CM<sup>2</sup>, uacToToii 1 1'ij, 3KCH03HIMCH 3-30 c. OCHOBHbIM HegOCTaTKOM TIpOTOTHna **HbneTCH** **OnaCHOCTb HaHeCCHHH na3epHOYI** TpaBMbl npH o6pa6oTKe TKaBCIrl 3y6a, CBH3aHHan c oTCyTCTBHCM B npOTOTHnC npolrepbbl **Onpej;eneHcI** THna o6pa6aTBIaeMOYI TKaHH.

I/I3neeTHo yCTpONCTBO J;nH O6pa6oTKH TBC) blx TKaHCil 3y6a na3epHbIM n3nye1n4eM (naTeHT WO 89/08432, A 61 C 5/00, npHOпHTCT 10.03.89 r.), BKno<sup>g</sup>alonkee nocneJ(ouaTenbno pacnono}KeHHble BJIOhb OUTH<sup>t</sup>leCKO\$ OCH HM11ynbCHbl\$ na3ep H cpeJICTBO ,HOCTaBKH 143ny<sup>t</sup>ICHHH K 3y6y B BHJe OITH<sup>L</sup>leCKOpO BOJIOKHa. OCHOBHbIM HCJIOCTaTKOM **JjaHHOpO yCTpOLICTBa HbHHeTCH** BbICOKaR onacnoc'rb **HaHCCeHHH na3epHOYi** TpaBMbl npH o6pa6oTKe TBep.gbIX TKaHeil 3y6a.

Han6onee 6JIH3KHM no **TeXHHUeCKoii CyUIHOCTH H npHHHTbIM 3a IIpOTOTHII Bb\$ICTCH** yCTpOLICTBO gym o6pa6oTKn TBepJ1b1X TKaHeii 3y6a na3epHbIM **H37IyueHHeM** (na'renT WO 90/01907. A 61 C 5/00, npWOпHTeT 25.08.89 r.), cogexratnee IIocneJcOHaTej1bHo pacnono}KeHHbie BJJonb onTHUecxoit Och **HMfynbCHbli2** na3ep H cpeJ1cTBO JjOCTaBKH H3nyeHHB K 3y6y, BKnlouaIcu ee OTpe3oK OHTH<sup>L</sup>ICCKOpO **BOHOKHa, BXOJj KOTOOpO** OBTvi ieCKH cOnpH?KeH c BbixonOM na3epa, vi **HaKOHCLIHKK, BXOJI KOTOOpO onTHUeCKH conp2Kelt** c **BbIXO**) OM OHTHUCCKOpO BOJIOKHa, a **BbIXOJ( HbHHeTCH** BbixonOM ycTpovcTba. **OCHonnbIM HC) OCTaTKOM** npOTOTHna **HbHCTCH** onacHocTb **HaHeCeHHH** na3epHo i TpaBMbl npn o6pa6oTKe TKaneLi 3y6a, CBH3aHHan c oTCyTCTBHeM B npOTOTHne CHCTeMbl onpegeneHHH T1/IHa o6pa6aminaeioi TKaHH.

3aJjaueii, Ha pemeHHe KoTopoia Hanpanneo 3annnHeMoe H3O6peTeHne, HbneTcH CHvoKeHVte onaciiocTB HaHeceHnn nai vleuTy na3epHoii TpaBMbi 3a cueT o6ecneueHHH BO3MO?KHOCTh onpej;enein5 THna o6pa6aTBIaeMoii TKaHH.

YKa3aviHas 3a) aua j ocTnraeTcn TeM, wTo B cnoco6e o6pa6oTKH TBep) bIX TKaHeil 3y6a na3epHbIM **H3JIyueHHeM**, BKJHoualou;eM BO3) eiiCTBHe Ha TKaHH 3y6a na3CpHOpo HMnynbCa, perucTpvipioT aKyCTHUCCKHii HMnynbC, BO3HHKalonjLn\$ npH B3anmoneilcTBHH H3ny<sup>t</sup>leHHH c TKaHbIO, no nuKo8o1i aMIUIHTy) a KoTopopo onpegem noT THn o6pa6aTBIaeMOLI TKaHH. **AnH HOBBImCHHH J;OCTOBepHOCTH OnpeJleneHHH THna o6pa6aTBIaeMOil TKaHH yKa3aIHb1il** aKycTH<sup>t</sup>leCKHII HMIIynbC perHCTpHpy1OT B J;Hana30He **3ByKOBbIX** <sup>t</sup>iaCTOT 85-95 kl'g. C TOLL ?KC U,embIO o) **HOBpeMeHHO** c **perHCTpaII,Heii** aKyCTHyeCKOpO HMIIyYIbCa **H3MCpHIOT** BpCMCHHyIO 3agepnKKy Me?Kpy na3epHbIM H aKyCTH<sup>t</sup>ICCKHM HMIIynbcaMH, nO **BenHUIIHe** KOTOOpOii yTO<sup>t</sup>nIHJoT THn o6pa6aTBIaeMOil TKaHH.

YKa3aHHa5 3aJ;aua TaK?Ke JjOCTHraeTen TCM, *4TO* ycTpoucTBO J>nH o6pa6oTKH TBep);bIX TKaHeii 3y6a na3epHbIM n3JIyerneM, cocTo5In ee H3 HOCHeJ(OBaTeJ1bHO pacnono?KeHHb1X BJ;Onb OHTHUeCKOii OCH HM11ynbCHOpo na3epa H Cpeg;CTBa JIOCTaBKH H31Iy<sup>t</sup>leHH51 OT na3epa K 3y6y, BXOJj KOTOOpO'O OHTHUeCKH ConpH?KCH c BbIXOgOM na3epa, COJ;ep?KHT aKyCTH<sup>t</sup>ICCKHII **npHeMHHK** H H3MepLTEJ1b nIKOBOil aMnnHTyJ(b1 3nCKTph<sup>t</sup>leCKYIX HMIIynbCOB, BXOJj KOTOOpO oneKTpyneCKAi conpH?KeH *co* **BXOJ;OM yCTpOLICTBa HHJIIHKaUHH**, npHyeM aKycTnueCKHi4 nplleMHHK ycTaHOBneH TaKHM O6pa3OM, <sup>t</sup>ITO **HanpaBneHHe** ero

WLIrEj, •(91 IH1) IIUEWE HHHarHAd£Ed Hdu oaalIIOIExHH£Oa 'Ea4Is&o a o.1o3133hHJ3A31f  
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N13H11auaEdJIEH a J,3KU1131L303 HJ,oOH4u3.L14HJ,3EISH LIOH41f31'1113MEN1 OJ3 3HHa116EduEH  
OJ,h 'N10£Edgo NIHx31J, ||U<sup>8</sup>HH3IaOHEJ,o1C 'g 3 UHN 3IIdu v11xaahH L3 cM31 'j7 MHHh3HOMEH  
11 0131011011 a0313ahL1J,u0 331U0I31hOIU31e '31daf£31u NIO11OXH11 a Haxcisduoa H3133h11J,110  
o iodo.Lox lfoxa 'g IC9/C£ x 31daf£311 ,Lo 1SUHahiCu£14 o.IOHdafEU 113113E.10011 'off Latlada 'j daf£Eu  
14HE£313lou ad1Lngl EH 'g'JR( EH EHa1HEJatiadU ouodo.Lox 311'133C3 'naa,aHodJ,aiC oninoNou  
a 'daNiadunn 'Huao£1111lead 4J,I4g J.axcow icnHaJ.ad9O£H I<sup>8</sup>ufNdo4) ru on 9030113 HIgHHaI(QISEC

owdaJ,ndx J,audio L311HOtfA aaHa11lad 303133hH1X3J, 0111E3 E 'l£OH0H ISa.L HLmIS  
HoxnH£Hdu K11H3J,ad90£H au1CN[do4 H XIquu3xcoU£Li q.1,aoHUICM080a 'aodoj.an PI Suliatfaea Oj

'11H31nJ,)JONianaIssue9Ed90 EU11J, 1.114H31Iho.LA gJ.30HMMON1£oe J,31SUHE1a011bdu  
Eo34u1C11I'114 X11313ahnioAnE xaxcdatfn£ Xi4HIlawada anHadaNi£H '1'1o£Ed90 1HxnJ,  
(<sup>1</sup>) 111131116 H11H311L d£Ed nth' Llu1pp1EMIH£oH '34IfA1NIH HHxa3hHJ,3AME 1'13h 'Ea4u/CIINi11  
OJOHdafEU EI1EhEH oH<sup>9</sup>u3J,H3oHJ o dx3cd3tt3£ ouCIU4naw swarm nuHalmideud  
11du I3H1HIOIEIHH£Oe 'o<sup>9</sup>udlu'TU 911313ah11J 31(313 OJ,h '01&11£1 .I'Hg'.I114 CH '31HLJ,113H  
H 111131116 n'nna mend Ni3J0dOU a1IIlou£axa.LaaJAOa '11HJd3He 11J,00HJ,0111I 11Heodd r'HE£EnOu  
NIOdn,LmniCH 9z%n'uj EH '(I) nUEL12e 11 (a) EH11J,Hatf 1111Ham/Cd£nd Nth' x 411101nxuH£oa  
'E03°a ICINIi XH3133h11J31CME '(9) 'iiooHxdaeou olbbNi3EHIGJ,E931d90 EH o.Iah 01'EhEU 'ISHHahAlf£u  
0.I011d3£EU 11L.Id3He LLL3o1JA1.0 '(E) Ea4ulcuNIU o.loHdafEU IJOOHeuOH3LHU I4NaiEdjnn1  
3I41HaiK3de 3111U0I1SH3K0u lauauaEJatfadu g,•.I114 EH '(HH31MJ,150113E1I'LLE9Ed90 NIOUHx -a's.)  
1saH3m d£Ed as Euodou IIOH11hul13u 11 IH31)J, Io13naI<sup>8</sup>.LEgnd90 aJ,aoHXdaaOU EH KFHahAu£H  
OJOHd3£L'U ol4.LaoHH11o11aLH11 'a'IUe(IINIU 1 11313ah1Ja2Cx31 oaalnoIAdudJaHaad 'E3IHN1and11  
oJOx3an1J,aICxn Otl '11HE3J, <sup>8</sup>.LaOHxdaaou IS31NI331ha1190 ISa1,31SUHls NII4do.Lox '31L 1£  
Ex1HhOJa14 J,O Na11HISOJ3331d :PIKEdO.LxEcl) ISNlad.L KaJ,agu3tfaduO uxxcdall1£ Ho.Le EH11hIu3\$  
•11HEx,L Kahalmcd£Ed 3UL'hEH o O.IaluOL aLZ 4Ifa.Lat(Hea 'E341MUNIH OJ03133hICLDA3 E  
Na11HaifHK011 ,11 Ea4u/tl11U O.loHdafEU ISMH3lp ff£Oe IKOI1Eh31H afxcaPI Exxcdal(E£ KEHH3Nt3d1  
IS3.LDE1101U9EH a31h~Crto 11a1I190 a '3I113hEH£ ISaH3HIAd£Ed x11 KUif 30Ni1111OX90aH J,anmI4eadu  
o.IODO.LO3'madam 'ISLIHahICIEI OJOHd3£EU OU0H341I/C111^I11 3191(£ 11I1ExJ, EH 11Ha,I3 3tf£OH wJ

'11HE31. II10113EHI4,LEgndg0 E1111X  
KMHaufaduo 4Ja0Hdae0Jaotf 4JSIaIgaOu <sup>9</sup>.LoomKONicoa J,a31lf a034U/CIINiH XL313ah11J.3kle  
avtaxau'aa ISEHg11Ed.Ln3no 'IIO£Ed90 murex tux 56-58 .LO.L3Eh xI<sup>8</sup>aoxAa£ 33011011  
s OIIH3111 OH411ENIH33ELY IS11HaIII0HJ o 3LH3h31H£ o.Lh '0Ht111a EMHiCa11d cmj '11U311te 11 3H11.LHat1  
H xl4Nialcdudaua.I 'ao34u<sup>8</sup>nwx XLI3130h11Ja/C31E eodL,xau3 tf&L111nrn3 K11Ha1II0H.L0 xu4EdJ  
1433CEdgo£11 111'.1114 EH Aida 56-58 .LO.L3Eh xI<sup>8</sup>eoxdef a3ouou a ISaJ a3tfO[119EH 'EHH,LII f  
11 111131116 IIHaul/Cd£Ed udu XIallOIE3111H£OH 'HOa411CID'UfX113133h11J.32CBE IfLLHIFU1iE xi4H03114u  
3IU11If£Ed 30HH3aJ331II1C3 331109113111 O.Lh '33c3131L 0HE£3131011 OHgUEJ,11MIId3113x6 LUhIEdO.LaV

'1LLH3L111EU KII^IHEd,L 140Hd3£EU 111111333HEH  
ISExa/Cu0tf an 'KLH3hAU£H OIU.IdaH6 11.L3OWIifoX9oaH aEhAifa s 4J,3131c11H3 4Jaounco11£Oe  
.1331 t 'LUI31xJ Ho<sup>P</sup>Ianal<sup>c</sup>u.Egndgo um, stm. atfaduo olxcoll o.IODO.,ox a1LLLLFI n i<sup>8</sup> 110110x1111  
Ou 'oI<sup>8</sup>H<sup>8</sup>3J, 3 K11H3hA11£11 1111aL3 pt(OIi11E£e nth' O.I3tttOIEx11H£OH 'E34mt11N111 oJo3133hILL . ME  
11Lt1EdLaLJad ulllI3dauo 31gA£ MaHExJ, 11MJ,09Edg0 9030113 s 311H3tt3aa 'NtofEdgo

4daoHxd3aou oIAN13EH14d,E9Ed90 EH .LO[ISicuEdIIEH 314113hitlf<sub>g</sub>H 3oHd3<sub>g</sub>EU 3OHa4UIt111VH  
'EH14S,H3tl 14 H11ENIe 14HHamdd<sub>g</sub>Ed mdu xllluotux14H<sub>g</sub>OH 'Etoo<sup>q</sup>ut1INI14 xxxaahlldattxa 1tLdLIIUUN13  
xIgHquudd,x3ua x14aoxnu m xaxcdallE<sub>g</sub> °111t,LHUUNIE x14aoguu HHH3haH<sub>g</sub> ai4HHOICE.Le  
E4Hah/tUOU xEx o Iod 3lfOOII °HIfeINe *Mitt* XI4IIHOIra Le aH.LOahE *I* H .LOI1tdI73)aI 'HICEINic  
*I* Hamltdd<sub>g</sub>Ed mdu ouatuorexMucoa 'Ea<sup>q</sup>uXurtm 0.I03133hM, abrE I4tltiLHlmNiE (3Ho<sub>g</sub>EUEHtt  
NIOHHE<sub>g</sub>E31 t a) HOH<sup>g</sup>UEdd,xaua 140140511411 H Hxxtdatec 'I411Aa,IlInu<sup>A</sup>IE HOHOiHU ISHHahrHc  
**UXI56** Olt **98** .LO .LOS.oah 33ouOU H Ea411itIU'414 0.I0x33na LoltXL' Ed,Lxauo AitiI 14ICIBYE  
otdaoxau .Lotuclaw<sub>g</sub>H H EO4u/tuwn O.IOMOahH.LO/txE (3HHEaO<sub>g</sub>Ed9o3du-agdAtcp 'dalvadiaH)  
3HHEa0<sub>g</sub>Ed9oadu aon<sup>c</sup> radxxauo d,HtloacaodJ •Ea4uAAIU<sup>A</sup>IH o.IoHda<sub>g</sub>Ei EIfehEH oH4uad,Ha0H,Lo  
Ea41161u~IH o.I03133haLo <sup>3E</sup> EIfehEH lt1131cdaYIE<sub>g</sub> .Loral ildltadup •ao<sup>q</sup>ultuNU4 o.E03133hada4cME  
ALCEhEH LIHIHOI1tHS.O,L2HJA00 'HHa<sup>P</sup>lada .LHMOIAI ,LoudazMH4 H 'e3auguilH 0.IOMoaha.I oA3Ia  
**AllLmul n** outaoxau doladaNN<sub>g</sub>I/I °iioxawaudu NIHX03hH.Lo&3I i4HO<sub>g</sub> 1.I0NI3Ehtt1190 H<sub>g</sub>I411ga  
I414HHa)aoouood .LOI/tdad.LOH.Iad 3<sup>c</sup>utifi pNH 14H)IO3ha.L3tt31a .I.O.Le •34u1tu is 1/I14M3ahH.L3tt311  
.Laaxaa<sub>g</sub>oa Hu rw nau3m td<sub>g</sub>Ed adf j •ttuahaH 0.13 aaluoL aLO•L3H.LOOa 'auawada .LH31IOYsl  
,LOLtdmoxH4 H O4uttu is HIgada<sub>g</sub>EU .Lo Adad.Loajad NIH.Le 3 ouxal<sup>A</sup>Iadaoalp •I4ifmmle Eli<sub>g</sub>Ed<sub>9o</sub>  
o.Iol hoaadgaICEx 4.LOoaxdaaou *of*taBa<sup>o</sup>%Lu ed90 EH d,otuaaeduau 14xa1daoll oaa,allada  
<sub>g</sub>3dan 'IVoda<sub>g</sub>Eu Nu4H34ukmrn 3oJ 1aMadaHa,l '3HHahAu<sub>g</sub>H 0.IO.Le aI3OII °EHII LH3lt HUtf  
xIcHHO1m.Le aad33he31 a <sup>L</sup> 11HIIEMHIIH4 3H,lal?odd,ag a d,otXda3xa41 °EHH Lu *I* HaJamAd<sub>g</sub>Ed  
mdu o.I31noraxa11<sub>g</sub>Oa 'Eag1 im a o.103133huLLo c) E I4lit(u,arn QE (3HO<sub>g</sub>EUEHlt u' oui•E<sub>g</sub>EaX  
a) 110H<sup>g</sup>UEdd,313u3 HOHO311411 H HxxCdaltE<sub>g</sub> 'I4lttLHUUNIE 140HOx14U H14H3hEHC •TJ31 **96 olt**  
**88** .Lo .LO.L3Eh 3aouoa a Eo41Ltu1<sup>A</sup>Ii oaoxa3h14,La[txE Ed.Lxauz Aicd,umir a oIttuOMHU d,olidaiY<sub>g</sub>I4  
H Ea411faly a oJOxoahadaXxa (3HHaao<sub>g</sub>Ed9oadu-34dtt0 'dayinduBli) 3aHEHO<sub>g</sub>Ed9o3du  
3o14UEdd,x3U3 .LHtloa<sub>g</sub>Hodu **8** HHYIEd,L4I a4I 14 amiaao<sub>g</sub>Ed9o3du o.Ion4ICEd.LxauO 3x0119 \$  
•E34Ir u **NH** O.IoHda<sub>g</sub>EU EIfEhaH OH4u3,LHaOH.LO E3<sup>g</sup>1rAIm14 0.I05133hadatcME arfehaII Xxaadalta<sub>g</sub>  
.LoiHUaltaduo H0UeadaLH14 XI4HH3113da HnH3d3Ni<sub>g</sub>H 3310119 g •Ea4UttuN1a o.I05133ha.LOANE  
AuehaH aatuolttadadaad,000 'Hu 13d& .LHa1NOiv LotAdaax144 H aogifttuNai O.IOx33h14d a/t is  
ALGLHuuNIE oittaoxan d oaHdaNi<sub>g</sub>a *9* i'i t&LHICUNIE v\_tOHOauu NI3113d,adaNI<sub>g</sub>I/I NI0aaHNI3adH  
NI113133hHd *3ICIM* I'HO<sub>g</sub> 11ONIaEh/tI90 14<sub>g</sub>1411914 NII<sup>g</sup>HH331O11O113Ed dAi1tdad.Londad a411&&IINI  
11Hx33hada1txe d.O,Le •34uAINEH H1431zahHd3AA31E daarHH<sub>g</sub>oa EHH,LH3t1 HHH3mAd<sub>g</sub>Ed adLI  
ItL[EhEH 0.13 I!HIIIIOGtadadaaLoo3 '11113NI3da d,H3INON1 d,oIAda3aa4 **6** HOUeadad,HH XIcHH3NI3da  
HH13dbwt<sub>g</sub>H 3310119 *of* H 34u~im'u v\_Hcada<sub>g</sub>EU d orAdaddaa.Iad pj Wodod,EddaH.13dodA4  
**ILLS** 3 OHHa<sup>P</sup>13da0Hlip •EHH.LHatt En<sub>g</sub>Ed90 0.I011oaOd9HUEx 4daouxdaaou  
01EYMaI4d.E9'ed90 EH dAIHifaeduaH *—*MHHh3HOMEH H <sub>E</sub> OH3OUGH 3Ox33hId.UO 301110IEhOIU3la  
?, Hxaad.3ott oad31tad3 <sub>g</sub>ad3h 'Nloda<sub>g</sub>Eu NI14H34u4tuwa aoiiaetdadaHaJ '3HH3hiAU<sub>g</sub>H  
oaoxe 3830[ 'Huewe HHHam[td<sub>g</sub>Ed Llodou 3atuolltad.ad and oo3 'a14H3h1H<sub>g</sub> aaluoIEm14Hadu  
'j Eda<sub>g</sub>Eu HHhEdaH3.I HH.lId3ne 41t3aodit d,o18auuaauadait oaod,e <sup>g</sup>ulf -um,ollodd.olf  
Ed,xEdd, o.Ion<sup>q</sup>uJ,LHdaji<sub>g</sub>a /txaod9Hriex xultoaodu NQaulHahutu<sub>g</sub>H NI4Hda<sub>g</sub>EU e9A<sub>g</sub>  
gauaxd,xlgltadaad,Hxd o9Ed90 NIOI1EhEH t13d3l •a9030u3 HHTia<sub>g</sub>HIread 14oud,adxHox danadU

'HHüExHüHH

eadavlodda t NNOttoxa **OD** H33FuHduo3 Hx33hadd xaue tllox14H a 'EMH11mH3adu 0.I03133ha LoAME  
NtottOXI4a 3 H3 Ifduo3 lax33had LM3ue o.Iodo.Lox ttoxa IIodod a 'uoueada.LHH xi4HH3NI3da  
HHUadaPt<sub>g</sub>H exou9 uotloxa <sub>g</sub>H Naatio 3 HaxuHduo3 Hxzahad,Lxaue tllox14a a 'Eda<sub>g</sub>EI1  
31011ox14a 3 H35CHdu03 a 3had,uo edod.Eddaa.13dod,O4 ttoxa NI3hIdu 'ol do.LEddau iadod.o4  
**6** aouBadad,HH xI4HHaPI3da Haa3daiN<sub>g</sub>H x0119 ax{MEJ, E 'L HHIIExattHH as Lojod Lo  
INOttoXa 03 H 3 / HdII03 Hx33hadd x3us ttOXI4a E 'EMHHNt311du o.I0313ahadattxE *3I011*oXI4a  
a HaHwduoa Hxaahadd xaus ouodod ox t oxa *9* fiO34If(tmNH xM1OahId.Lxaue I4ttA LH11nNtw  
goaoxuU 4ua.LHdap1<sub>g</sub>H **o99** **p > eTT** :oiaaoua[t usiluoindoaI uaott& *uo.LA* **69A<sub>g</sub>**  
Eda<sub>g</sub>E11 .1.o HHHah1AU<sub>g</sub>H Hxaadaoti Eadattado atiox11a um moo 150xa3nH.L110 NI3HH311'UEdIIHH  
a .1anuaad003 Hd30H<sup>g</sup>IYaLaadaa1th YIOH9IIE NIH3MENI 0.13 aHHauHEduEH 0.Lh 'INO<sub>g</sub>Ed90 NIHSIEJ,  
Iy414HHOUaOHEd34t 'g xmlu<sup>A</sup>I3Hdu UHx3ahHda/txe *I;#* MH1u13HOHEH H g OHXOUO1 30333hLd,UO  
aatuOleh0111xa 'ed3<sub>g</sub>Eu Ntoltoxiga a HaMCHduo3 Hx3ahMd,uo o.lodo .ox ttoxa 'z S91i<sub>g</sub>x Eda<sub>g</sub>Eu  
a,o HHaanAu<sub>g</sub>H odoHd3<sub>g</sub>EI Hxaadaott 0adatiada 'j da<sub>g</sub>EU I<sup>g</sup>HE<sub>g</sub>EHEHou adLiup EII °g',I14~  
an au3uaa Lotiadu ouodod ox ENTaxa 'EHdaHoddatt ol4tuoutou 3 daNtaduan '11Eaocmue3d 4d,I4g  
.La noNI HHHa. adgo<sub>g</sub>H 14u~tNIdo~ <sub>g</sub>u ou 9o3ou3 1RI4NtaB11aIE<sup>L</sup> HHtrexntiaa EHdaHoddatt  
Nlotfoxa Oa H33E{Hduo3 Hxaanlldd xaue tiox14H a **ti,Ix** **86-98** HHHa l3tCiiodu LiOaouou 3  
**8** Ha11add,4ua4I H HHUeao<sub>g</sub>Ed9oadu OJOH4ued,Lx3n3 xou9 <sub>g</sub>adah ExaHNiaadu o.IOx3ahHdattxe

soma EHOƚEuENtf o.iowaunaadu EYINHEd.I<sup>⎯G</sup> IsKHxdag .I.aEini4aadu aH on-mod& ItLQOHHEll Ou IgHUOa NOHdEY(d N,LOOHHauaEduEH 14NU'cEd.IENtf igHNdlunAuou aaHahHƚ HN.LHatf N mime EH KNH.L3NatƚOa o.IondaƚEu aoNlax{ad xL'd,LawEduu xi4HhrnƚEd Ndu aodaƚEU xI4HaquCuNIN E.Ltdx o oxodx i **nut**( •I4112CLNUUNia goaqueJINaME1''I **Oj** oiHaodA ou i411UOa NOxaahN LD~t]IE NOHdul:tA N.LoOHHauaEdUEH IgHINIEd.IENIt EHNdwu ƚuou EHauUGHE.La2t OH'IUE.LHamdauOxe NN[Edo.1.aV -v\_ioxoahMdarl)a x E3Iƚ14119 EHIOH KEx3 hN.Lalt E ISEHƚaIOj '(130 i OM3 hM.LUO 011 'a•.L) 15NH3h[tuƚN O.IOHdaƚEU iSNHaHEd.Laoduaed OINHauaaduEH PIOH%OIIOUGHN.LOdu 'NNHaueeduBH a au.ld NIOHaua.L noxcA a Kax anad.l.aodu3Ed N LTOH113uaEduEH IS3.Laauaa EHUOa KEHdaI(c•NHEx.L NNHamAdƚEd Ndu u3YIIOIMIIHCOEI '**WHIMS** |, O3133hII.L3Itxa 3 OINH3HHEdo **ou** N.L30HH39030 .L33rIN EHIOH KEHdn (**A** O3E14t0 '11OH51CojTƚOH3H Nxaahn.Lxadu ornad.Lavmad o.Ia Ksualt 'Ea4UluNiN O.IOxaahN.LDAIIE O.IOHƚ3110U AIISLNUUITe (cud **Oj** a oudaviadu) cud oJOHN1 oa .LanIIII4aadu n HHExx NONIanaI4.LE9Ed90 **minx J,o** .LNozaaƚ 311 '11H.Loah i zodaNƚEd n oi4.Laodoxa KaLauuah'aduo ImIIUOa aondeh'IC E1 **ALNUIIN V** 'EHUOS ISExoaha.Lattxa KenduliA .Laaxr coo Alah 3.LE.L<sup>q</sup>u4tƚad a '014.Laodoxa L\_Toaox/taƚxdaaa oo axA1ƚOa a uai.oi ƚnad.Laoduoad I471N.Loah ILLS '*IMMIX* 01HH3hX11CII AaoHdaƚEU Ahad.Louau .LiSa0HI4a NIaNHauaatt NINxoaiga **troll** I4ƚE.I 3I4.L3d.IoƚEd •3NH3dauau n aaHamAdƚEd aoHha.LOEh **xN** .LNi'Oxoad[j •dA.LEdaum.L xaxoalga Oh' KaLOiEaad.IoƚEd E9dƚ NHEn.L **oi**<sup>ƚ</sup>lidaa.L amiAIAaa*i*'L.LE9Edgo EagUluWN o.loadaƚEU NlaIH.Laigatf tf0[j

'ivahuxialaua a xyloxaoa E1lodadu x[/[ •NHEn.L '13auom tdƚEd o onHaH.LoSladaouaH 314IanEƚKa3 on 'I4aquAi m 3113133h1l.LOAAME .LOIEnaHEOH 'OxaHtfO **IMMIX** ax.Lo9ad90 adjj •NOa'uAINN Nli4HdaƚEu NHEM.L NNHamAdƚEd Ndu o111110IExrHƚOa '14aglsfunm oa3133hz.L3ACxa <sup>q</sup>waaodad.I.ozjad ONIN1(Ox903H NHEa.L **II**oi oaaIV.LEgadgo oua.L 0 IIINIENIdo4 HN KNHah/ 11011 Kut(

'NHEM.L aONouals E9Ed90 auN.L 0 LlaN11ENIdO~HN a NNa.L3•L3H.L003 H EdocaU 121111Ed3nal NoN.IdoHc ISNHauHEdIIA oz4.LooHwONiƚOa Ka.L3EHNh3UO39O NIONHah/AUƚN Nu4HdaƚEU Eg.gƚ NOHEM.L xi'lfdaa.L 1/1a.1,0gad90 IgdAlallodu 4.L3OHaiIIOƚ3g 'HN.LHo 1 MEx oBh/tua NIOHHN.LOdu **S** 'g1IBNIe aEx .I.OIISualtaduo EgAƚ YHExa. oiA 1doai. oanaeaI4.LEgad90 o.L 'OHHaU.LaL3a.L00a EHN LHatt N NIfENIe NHH31ILtdƚEd NIOHdaƚEu Ndu xahioi xNHƚOH 'aoo u tIIYIN xaxaaha.LoAxa xaxtdatfeƚ KNHahaHƚ oi4HHO11B.Le 111 '61 3tf.I /('r1 + <sup>1</sup>) < 1 :olnaouoA .LaKdoa l airH0li/C <sup>1</sup> EaquAUNIN o.loadaƚEU oH<sup>q</sup>ua.LNaoiLLA Ea4[[AlnaN 0.I03133ha.Lalt3IE Exxadatfaƚ HEHHada<sup>P</sup>!ƚN 11I1a3 'oahAIIa NIO.L \$ 'EHN.LH31 ' N H UENIe xaxcdalfaƚ NNIKNHahEHƚ NNII4HHOI1E.Le 3 33 .LAIEaNHHEd9•HHEM.L NNHautdƚEd **nth**" o.131110IEnuHEOH "ea<sup>q</sup>**uAI1H** o.loxaahn.LOAxe NiOUEhaH N EaeuAuKN o loHdaƚEII NIOIIEhaH Allman 1C.Inedaltec .LOIHdONiƚN 'EUahaH 0.13 wiioi ON1 .LOIAdaaxxc N o4uiuNr viqudacaU .LoLCdad.Lau.1ad Edoved.Loz.Iado.Lo4 oi\$HON on o E91tƚ NHEa.L VOP1oaa14.LEgadgo Eua L IcauoHhO.Ltt KUtj

•HN.LHatf xux - aahAua N1oHHNxodu a '4uaN1e aEx .LOIKuattaduo Egdƚ 4HEx.L otAldaa.L oLANiaeaI4.LE9Ed90 oa. 'oHHaH.LaLaa.LOOa EHN.LHatf N Hume NNHaIUAdƚEd nondaƚEU Ndu xNluoiaxnrƚoa 'HOaqu/tuNIN xaxaahH.L3A Ed.Lxaua I tft.LNUIUP lƚoaoxau ISNHahaHƚ oKUnHOUB.Le- <sup>u</sup>**S** <sup>i6</sup>**g** atf.I '?,/a**S+6S**)>**S** :ouia0113A .1.aisdoa.Lauaot(A **g**)I,jx <sub>26</sub> **Olt gg** .L0 .LO.LoEh 3o0uou H ao irAuNIN O.IOxoahN.LOAxE Edxxaua ullAJ-NUUNre uvaoxau ISEHHadaNiƚN Nuaa 'aahltl D 110.L \$ ''eHN.LHatf N NIIENTe Kull Ed.Lxauo tfLi,nums a xi<sup>ƚ</sup>aooxxw NI1KNHahaHƚ 11P119HHOUE.Le **3** 33.1,01WaHaad) 'li,jx **26 011 QS** .1,0 .LO.Laeh aamion a Ea<sup>q</sup>**uSu** i 0.103133hN.LoAxa Edxxauo I41fLLNuNNre 311113hxHE (3oH4II8NIN33MI) ooaoauin .1.0I1fd3p1EN N Eo **IrA w1H** 0.I031o3ha.LoAaa oNHEHOƚEdgoadu eon4UEd.Lxaua xisdoƚNOdu mum. IƚONiaEHl4LE9Edg0 Ena.L 1SNHouid ioduo N.LOOHdaaO.L301f Ki'IH3MIgUOU Kut(

'ni LHalf xux auhkia Niofax.Lodi a '4UENIe xux .Loxauattaduo E9tte **um's. oiA** tdoaz. oLtNlaaaI4.LE9Ed90 oL 'oHHaa.LaLaa.L000 EHN.LHatf N NUENE NNHaNLtdƚEd rioxdaƚEu Ndu xaniO1ExNHEOa 'aoa <sup>q</sup>**u/Cium** xxxaaha.LoAae lettAs unn' a ijoaoau KNHanaHƚ aIGHHOUE.Lƚ **vd** '6**v** attl '**z**,/(t(y+'d)>**V** :oINHOUa& ..andoa .auaol1A <sub>4</sub> Ea<sup>q</sup>uAluua o.loxooha.ia.CHE uh'LI,Num a issaoxIU isauuadaulƚN 111133 'OehlAII3 N10.L •EHN.LHatf N NIENIe Kutt tiI~LNUUNre xu4HOaxu NNIKNHahBHƚ NNII naoue.Le **3 03** .LOIEaRHHEdo N Ea4UAirIN o.IOxaahw.LoAaE o.IOHHEli AI/tLNUUNIE oLtaoaau 3,011fdoNiƚj/j •NIoxH3h411ƚN N1I4HdaƚEU E9Aƚ NHEa.L giotfdaa.L NNHomAdƚEd Ndu \$INlncrexNHƚOH 'aqurAn is NNxaaha.Lo/txE .I.OLCdadl.aa tad •Eg/Cƚ NHEM.L Uolidaax



'IrEH.Im3 vllrtx3ahNd.Lxaue a xaLattcEdgoadn °rvoxmHVvamdu IHmM3 hm LOtjJE o.Iovva1dlad.LJI1Jad  
'E34UAUVVm 0.IO313ah11J3/CNE i^IOLIEhEH m °rvodosuedJam,lado.LOI) oJorlaAdmd.LJLI,Iad 'E34u[Cm m  
oJOHdacElr nOUEhEH IClixcara Exxcdalfuc aoireada.LHm xi°HHaraada aua.Ladaa4wa atfoxr a  
11FI °g ExmHNlamdu 0.IO3133hLI.Labre N1o1 OXI4a 3 HaWWISduO3 Y13133hwd.Lx3ue aOUEada.Lllm  
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m j 11daeBU' Piolfoxtga 3 Nf°uIHaxczdu03 Id3133hH.LUO 'Kr((D 11t0m11'OJ04) acEg EH 01  
dos,Bdaam.Iadotor)I a,umcdatto3 on4Ira.LVIHUOuoh oaLo od,L3A ax[x11y °9 Edo.Lxa.Lat1 oaoaoxuu  
Ntolioxa 03 HaxcISduo3 ux3ahad.Lxaue 11Oxi4a u 'g ExrnNamdu o lox3ahLI.L3ttxE IYoltoxi a  
3 H33KISduo3 1113133haldLB3Ue 1foxa o.Ia o.Lh 'NIOEEdgo NIL13ML LII4H131E0H11J31C '988 'j°.LNI  
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'g E03gLal1111 xux33hvld.Lxaue mmt ud.,°um u auxuaocEdgoadu o.Ion4IIEd.L31au3  
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o8Z Uo.IA AgAc EdacEU LO KvIHahucVI HxrE.L3oti Ee.Ia1lad3 alioxl4s EH aoo IIOx0ahILLllo  
rva11HoUaBdLI11H 3 .L3ISUHE.L303 u.L3OH4ud.LI4H.LOaAh IUGH41feNm33ren o.Ia 311HalcEredueH  
O.Lh 'NOCEdg0 mom. r\_IH°uHauaonu.Lo '881tw8g mxdENl g Ho4 odxNNI HaWOlromard  
14raalana vlatnolAdm fulolf, axv4HhaHO)EH U ;5OHHaxcoL1OU3Bd E3A310q oJOH1'eC LO Ivly g{,  
maHKO.L33Ed 'Edacut i oltolx4a a uaxcuduo 1/13133hILLUO JHHahi ifcu vlxs11J,3011 Es.L311ad3  
Ifoxa 1lmx3ahm.LUO Nlahmdm °rave gZ I'4aUHISO.L3aud ru Ha&xo(p 3 Am.1,ono oiAnoIAdI43Ax04  
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1113133hm.LUO &MO a011311110111411 Z A91Ce x'edDEEU .Lo umnahAucm mxsE L3o1foasallad3  
°18[10:J,101,] EH j dacalr rI4no icAunu Hudgi4s uaHahAClrcm E31aHhO.L314 as.LaahEM g

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lfoxs °Hodos,s 'aoueadaLHa xi4HHaraadu umnadaraem ExoLlg aoltoxa Om 14IaH1111 3 Haxcxdnoa  
mxoahads xaue tfoxl°a u 'j adaeau iio (oxi4a a Haxcaduo3 11x33hm.L110 Edos,Edsam IadosAtp  
ltoxa Ptahadu '01 dos,Edsam.Iados of m 6 aoumsdasmu xl4HIIaviada anuadawem  
xoug (Taint, 'no) smxcdalfoa on°IraLmuuouoIf os.IaaodaoA unna.Ladgoem I4ir wdotl) 9°11 Ojj

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'11,jx 86-88 ISUHExaAuodu ao3ouou 3 8 maTlada,qum4 m uauaaocadgoadu o.Iongiiads,xau3  
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°UOLC AgAc x adacaLc J,o u11HahAuem mxa11J3otf EEJa1fad3 Aroma EH moo ijOxaahms uO  
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OJ,h 'NIOcadg0 ramxBJ, a aoe.L3/C g xmluaamdu 14aMo3h11JaAC11d '17 aHHhoHOiEH m  
BHH0uoa 0.I0x33haJ,uo xoead,Lo ar°mHa3mououaed OH4uai.aao aLI30U NlrlnaacdattO3 'Z ICgICO  
x Edacau .Lo ISmHan/ar m maEaJaotf Noa I tfad3 03 Haxcaduo3 mx3ahm.LUO oaodos ox tfoxt4s  
`j dacalr IaI4H34i[tCllrvn (8%114 'pm) J,Hmalatfo3 oa aodja/C amxasadgocm I4uAndo4) js °u

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110MBm3d u11HaxcaLoo ( raa11EOU3/C NII4rvmtioxgoaa IS3.L31SLI3U ' o98 ) p ) OTT :oiaaouag  
LImtnousdoaJ,auaoti/C °D LIOLC Agile x Edacair JA ISaHahICuch I aaJa01f EaJaltad3 at(oxI a  
EH 1130 IaOx3ahm.LUO K212H3LIaadIrEH 3 J,3auua.L303 m L30H4ua taa LOELgh 11OH4uEra1133111NI  
O.Ya amuoLcaaduEH OJ h NIOOEdgo ramx.BJ, UGH1113IEOH11J3/C 'xaHNlamdu Hmx33ha LoAxa  
o.Latnexadalfuo 'Eajar\_IodsaA u11tlxdddJauox mmua Ladgoe11 raatxaosaau a aaNaauBulladu  
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**RU 2089126 C1**

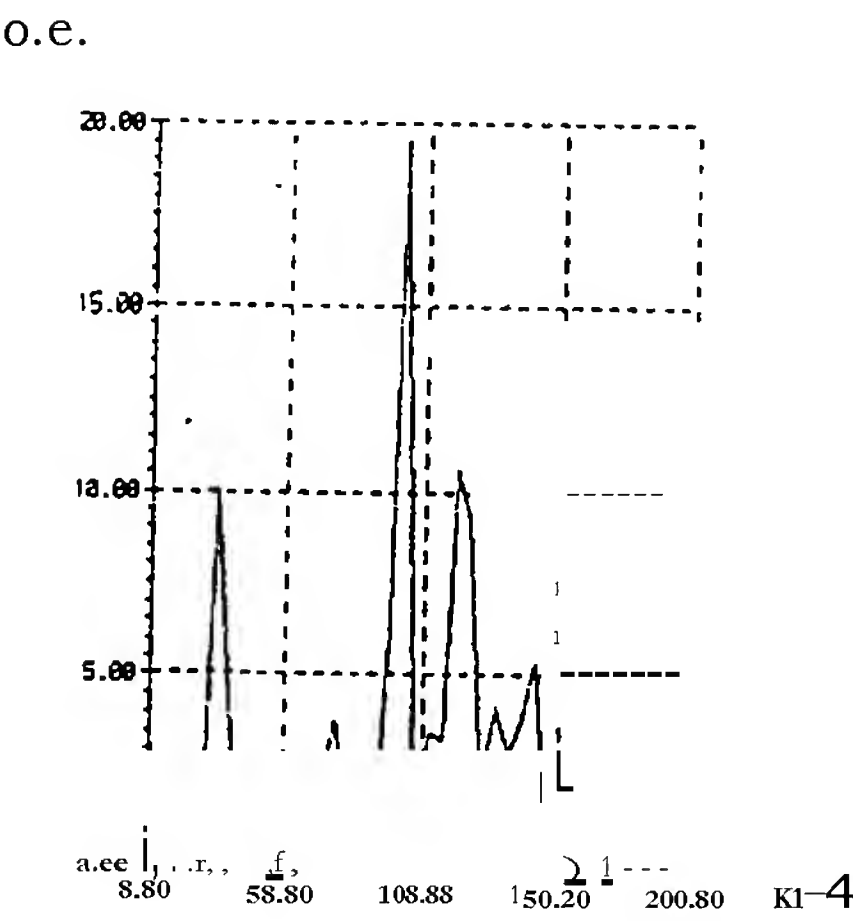
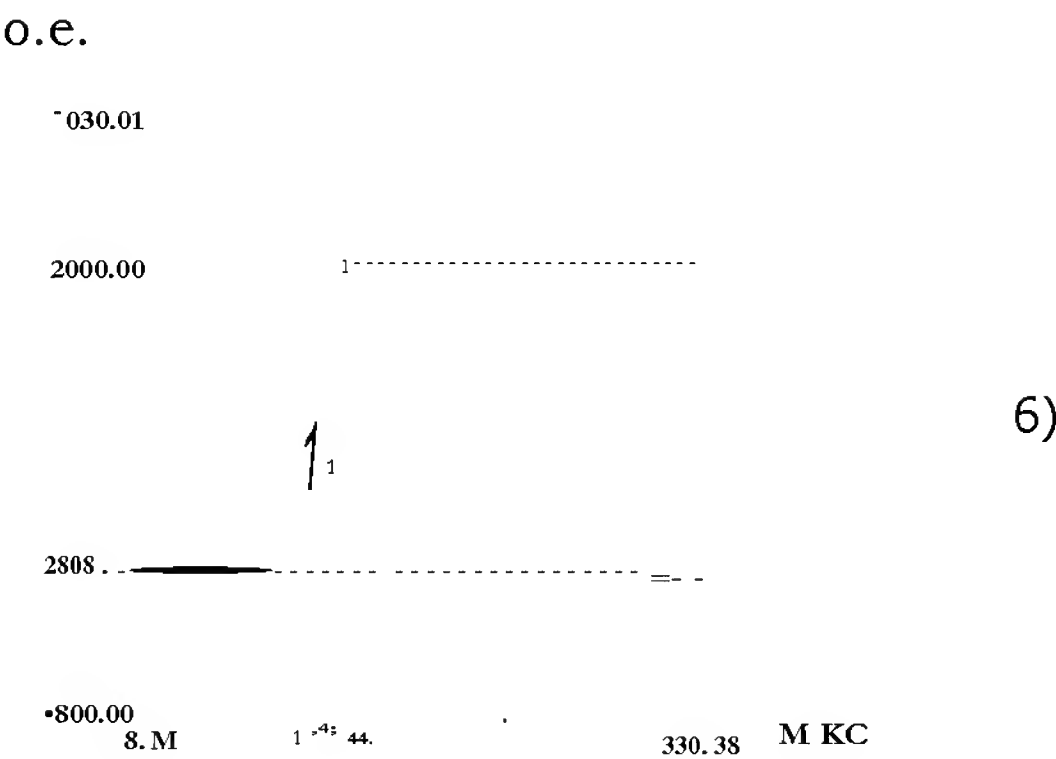
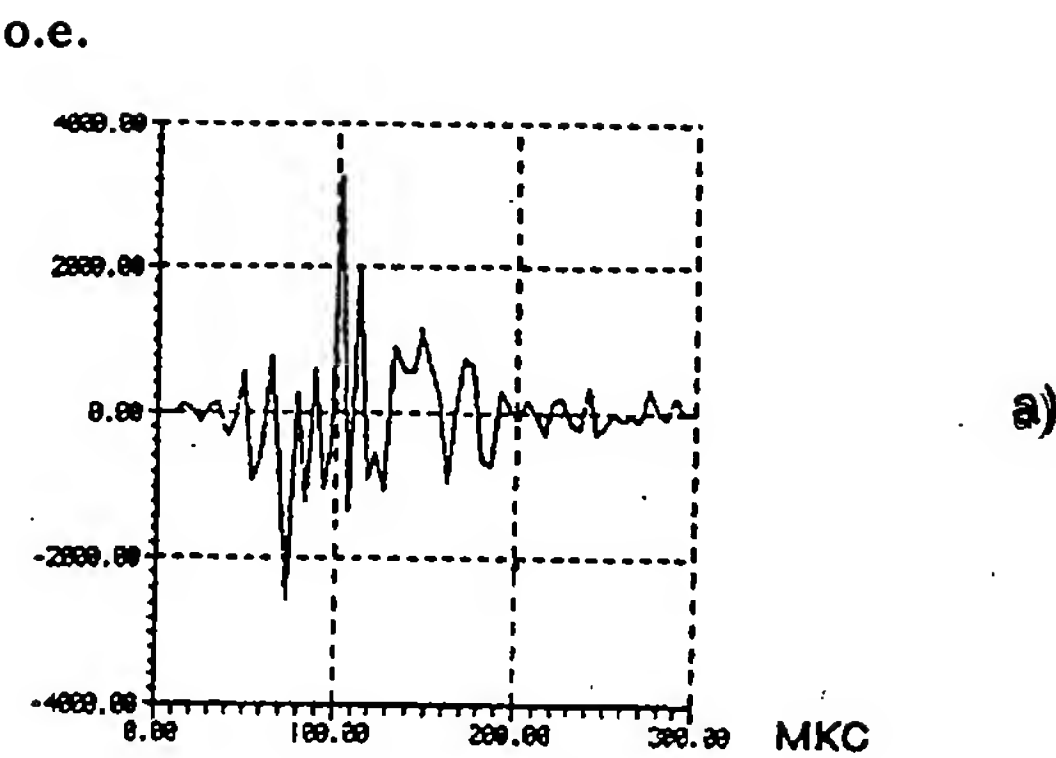
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**TaIHM o6pa3oM, Ha OCHOBaHHH BbIIIell3nOIKeHHOI'O 3as rmeMas COBOKynHOCTb npH3HaKOB B cnoco6e H ycTpoilCTBe 17O3BOn\$CT peIIIHTb 3aJ a<sup>1</sup>ly, a HMeHHO CHH3HTb OnaCHOCTb HaHeCeHHA TpaBMbI nau, eHTy npH na3epHOH o6pa6opKe TBepgbvc TKaHeH 3y6a npH neueHHH KapHeca H npoTe3HpoBaHHH.**

Claims [OopMyna x3o6peTeHHsr]:

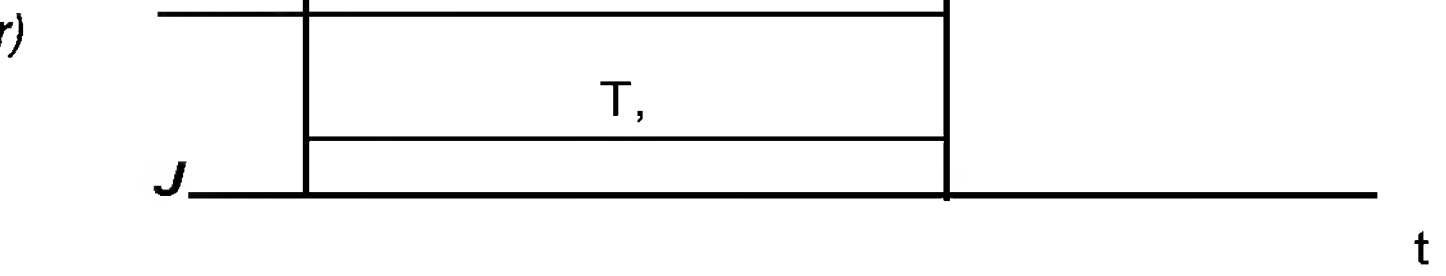
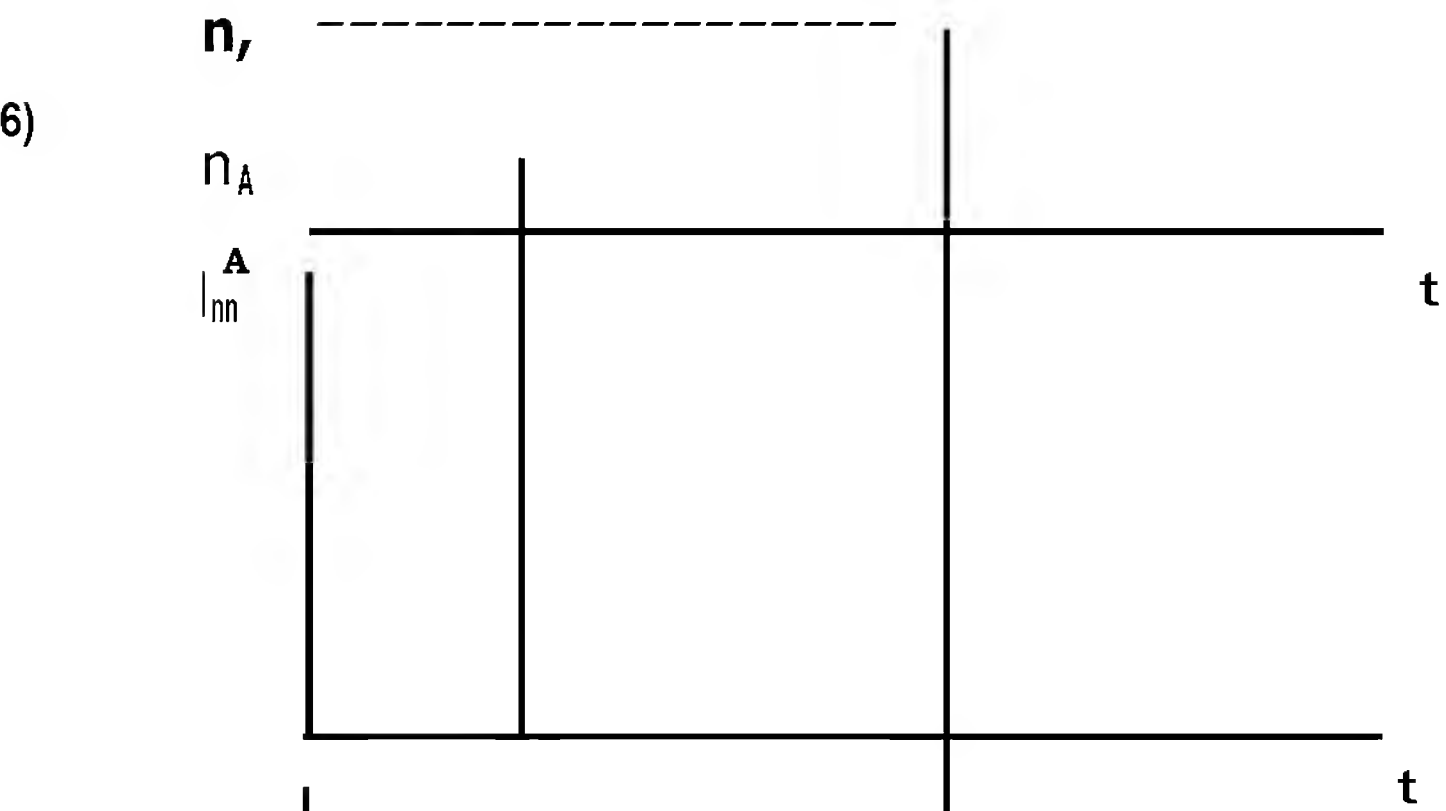
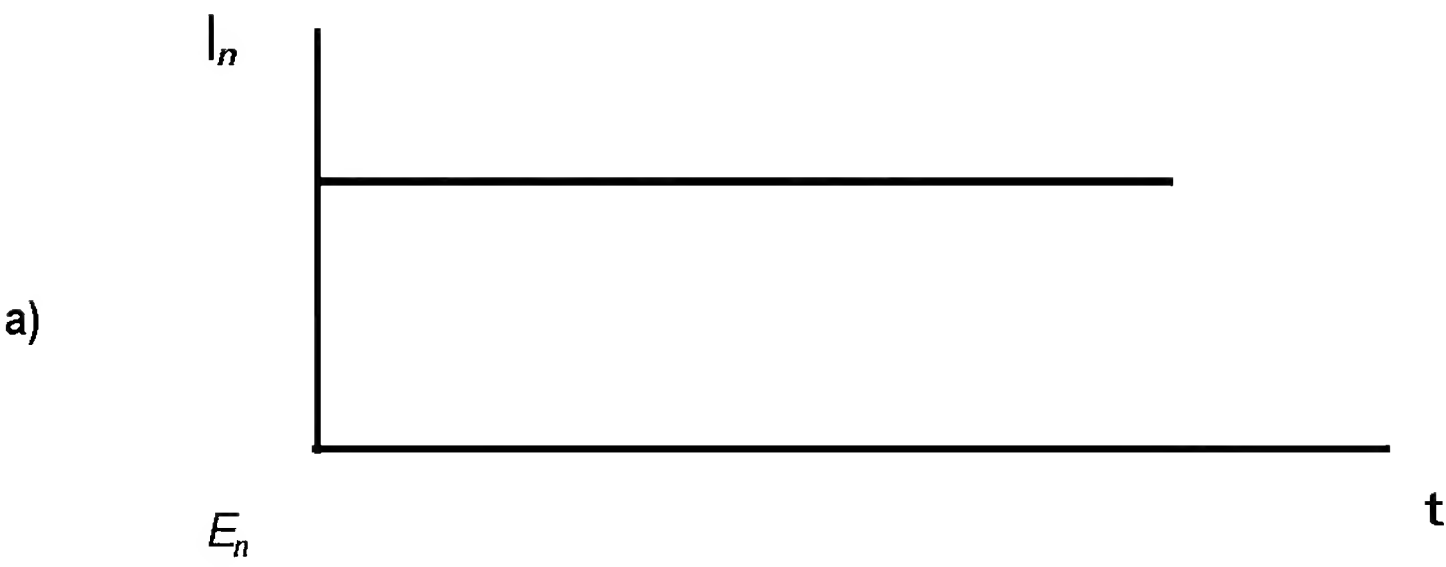
1. Cnoco6 o6pa6oTKн TBep)bIX TKaHe&i 3y6a na3epHbIM K3nytleHHeM, sn iiouaioBugi B03AC CTBHe Ha TKaHH 3y6a na3epHbIM HMnynbcoM, oTnHLIaiOIIj II CH TeM, uTo perncTpHpyIoT aKyCTa ICCKH HMnynbC. B03HHKa7On;HIYi npH B3aHMO)Iei cTBHH H3ny\*aeHHH c TKaHbIO, no nHKOBOi airuiw iyije KOTOPOPO onpeirmnoT Tnn o6pa6aTmbaeMo2 TKaHH.
2. Cnoco6 **no n.1**, oTnn'lalonvelftCH TeM, LITO aKyCTH<sup>L</sup>IeCKIIИ HMnynbC pCIHCTpHpyIoT B jjnana3oHe 3ByKOBbIK <sup>L</sup>IaCTOT **85 95** Krij.
3. Cnoco6 no n.1, OTnn<sup>L</sup>iaJon;uiICI TeM, HTо OjjHOBpeMCHHO C perHCTpaljHeik aKyCTH<sup>L</sup>ICCKOPO HMIIynbCa H3MepHIOT BpeMeHHyo 3ajjepitxy MeicJ y na3epHbIM H aKyCTH<sup>L</sup>IeCKHM nMnynbCaMn, nO Benn<sup>L</sup>IHHe KOTOPOLI yTO<sup>L</sup>IHHIOT Tin o6pa6aTbIBaeMOId TKaHH.
4. YCTpoi c'rBo jjni **o6pa6oTKн** TBepjjbzX TKaHei 3y6a na3epHbIM H3nyeHHeM, cocToHnRee B3 noenejjoBaT2nbHo pacnonoiKeHHbix BJ;Onb OIITH<sup>L</sup>IeCKO2 OCH HMnynbCHOPO na3epa H cpejjcTBa ) OCTaBKM i3TlyeHH51 OT na3epa K 3y6y, BXOjj KOTOPOPO OnTH<sup>L</sup>ICCKH COHpi7KeH C BbIXOjjOM na3epa, oTnnualonjeeCH 'rem, <sup>L</sup>ITO yCTPO2CTBO CO) CpxiHT axycTH<sup>L</sup>Iecxn171 npMCMHHK H H3MepHTCnb nHKOBOLI aMnnnTyjjbI 3nCKTp1<sup>L</sup>ICCKHX MM IynCOB, BXOjj KOTOPOPO 3nCKTpH<sup>L</sup>ICCKH COHphJKCH C BbIXO,j OM aKyCTH<sup>L</sup>IeCKOPO IlpneMHHKa, a BbIXOjj 3neKTp11<sup>L</sup>ICCKH COHphHKeH C BK0140M ycTpoilCTBa HHjjHKaU,HH, npntieM axycTnuec ii npHeMHHK yCTaHOBHeH TaK, <sup>L</sup>ITO HanpaBHeHHe ero MaKCI1ManbHOLI LIyBCTHBTenbHOCTH COCTaBnHCT C HanpaaneHHeM OnTn<sup>L</sup>IeCKOLI OCH Ha BbIXOjje cpejjcTBa jjOCTaBKH 1113nyeHHH OT na3epa K 3y6y yron a, yjjOBHeTBOpHIOnjivl ycnOBHIO II ° d < Ss° 5. YcTpOIICTBO no n.4, oTnnuaionjee i TCM, <sup>L</sup>ITO BXOjj 113MCpHTCnH nHKOBOYi aMIITIHTyjjbl 3neKTpH<sup>L</sup>IeCKHX HMnynbCOB 31ICKTpH<sup>L</sup>IeCKH COHph?KeH C BbIXOjjOM aKyCTH<sup>L</sup>ICCKOPO IlpneMHHKa Liepe3 6noK CneKTPanbHOPO npeo6pa3oBannn n 4 HflbTpaljnH C nonoco I npOnyCKaHHH **85 95** KN.
6. YcTpouICTBO 110 n.4, oTnn<sup>g</sup>alonjeeCH TeM, <sup>L</sup>ITO OHO ) OHOTIHHTenbHO COjjePKHT (DoTOpePHCTpaTOp H 6nox H3Mepenin BpeMennbix HHTepBanOB, npnueM BXOjj (4OTOpePHCTpaTOpa OHTH<sup>L</sup>IeCKH colipHxieH C BbIXO) OM na3epa, a BbIXOjj 3neKTpH<sup>L</sup>IeCKH COHph?KCH C OjjHHM 113 BXOPOB 611OKa 113MepeHHH BpeMCHHbIX 11HTepBaTIOB, BTOPOYI BXOjj KOTOPOPO 3neKTpH<sup>L</sup>ICCKH COHph}KeH C BbIXO) OM aKyCTH<sup>L</sup>IeCKOPO npneMHHKa, a BbIXOjj 3neKTpH<sup>L</sup>IeCKH conpHxcen c BXOJZOM yCTPOLICTBa HHJ nKawH.

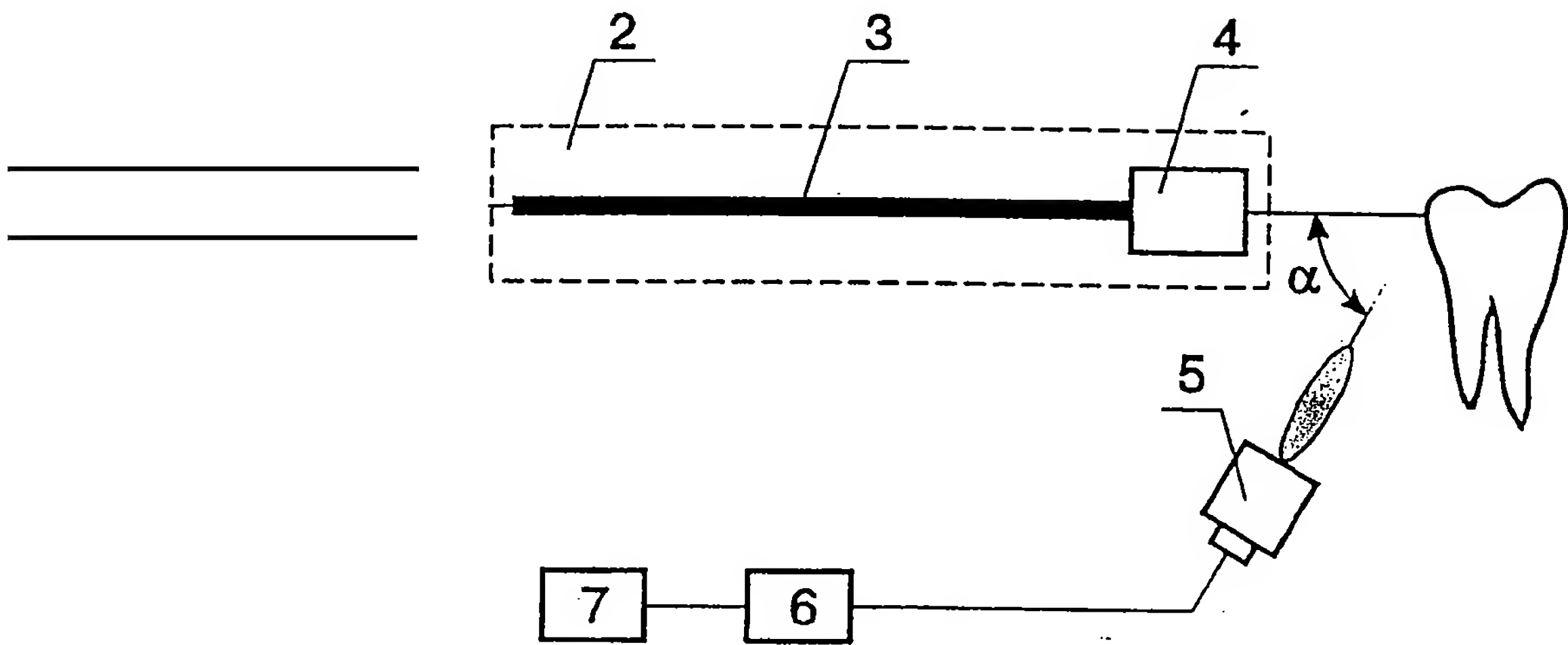
Drawing(s) [xlepTemn]:



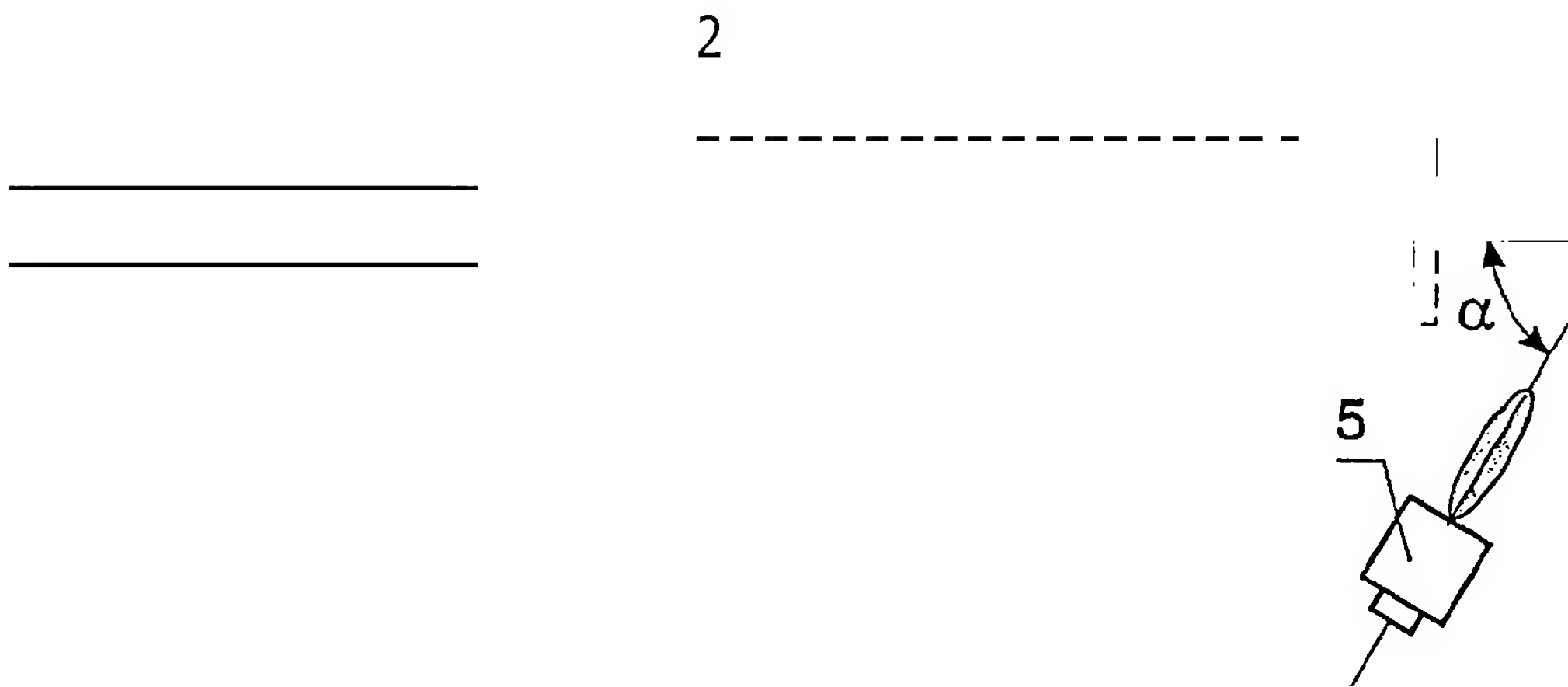
pie,!1







*Cbu2.3*



*фиг. 4*

2

